

THE INVENTION CLAIMED IS:

1. A filter element, comprising:
 - a fluid permeable core element defining a central core element flow channel through the filter element;
 - a fluid permeable ion exchange resin layer disposed about the core element and adapted to remove mineral and organic acids from fluid passing through the filter element; and
 - a pleated filter media disposed about the ion exchange resin layer and core element.
2. The filter element of claim 1, further comprising first and second fluid permeable separation layers sandwiching the ion exchange resin layer therebetween.
3. The filter element of claim 2, wherein the first separation layer is disposed immediately about the core element and the second separation layer is disposed between the ion exchange resin layer and the pleated filter media.
4. The filter element of claim 2, wherein the first and second separation layers are made of a material selected from the group consisting of glass, cellulose, spun-bonded nylon, and polyester.
5. The filter element of claim 1, further comprising a fluid permeable outer casing disposed about the core element, ion exchange resin layer, and pleated filter media.
6. The filter element of claim 5, wherein the core element and outer casing comprise perforated metal or ceramic material.

7. The filter element of claim 1, wherein the pleated filter media is co-pleated with a wire mesh.

8. A filter element, comprising:
a fluid permeable core element defining a central core element flow channel through the filter element;
a pleated filter media disposed about the core element; and
a fluid permeable ion exchange resin layer disposed about the core element and pleated filter media and adapted to remove mineral and organic acids from fluid passing through the filter element.

9. The filter element of claim 8, further comprising first and second fluid permeable separation layers sandwiching the ion exchange resin layer therebetween.

10. The filter element of claim 9, wherein the first separation layer is disposed immediately about the pleated filter media and the second separation layer is disposed immediately about the ion exchange resin layer.

11. The filter element of claim 9, wherein the first and second separation layers are made of a material selected from the group consisting of glass, cellulose, spun-bonded nylon, and polyester.

12. The filter element of claim 8, further comprising a fluid permeable outer casing disposed about the core element, pleated filter media, and ion exchange resin layer.

13. The filter element of claim 12, wherein the core element and outer casing comprise perforated metal or ceramic material.

14. A filter assembly for filtering fluid flow in turbomachinery, comprising:

a cylindrical housing, the housing adapted for fluid connection to a turbomachine; and

a filter element disposed within the housing and adapted to filter fluid passing to the turbomachine, the filter element comprising:

a fluid permeable core element defining a central core element flow channel through the filter element;

a fluid permeable ion exchange resin layer disposed about the core element and adapted to remove mineral and organic acids from the fluid passing through the filter element; and

a pleated filter media disposed about the ion exchange resin layer and core element.

15. The filter assembly of claim 14, further comprising first and second fluid permeable separation layers sandwiching the ion exchange resin layer therebetween.

16. The filter assembly of claim 15, wherein the first separation layer is disposed immediately about the core element and the second separation layer is disposed between the ion exchange resin layer and the pleated filter media.

17. The filter assembly of claim 15, wherein the first and second separation layers are made of a material selected from the group consisting of glass, cellulose, spun-bonded nylon, and polyester.

18. The filter assembly of claim 14, further comprising a fluid permeable outer casing disposed about the core element, ion exchange resin layer, and pleated filter media.

19. The filter assembly of claim 18, wherein the core element and outer casing comprise perforated metal or ceramic material.

20. The filter assembly of claim 14, wherein the pleated filter media is co-pleated with a wire mesh.

21. A filter assembly for filtering fluid flow in turbomachinery, comprising:

a cylindrical housing, the housing adapted for fluid connection to a turbomachine; and

a filter element disposed within the housing and adapted to filter fluid passing to the turbomachine, the filter element comprising:

a fluid permeable core element defining a core element flow channel through the filter element;

a pleated filter media disposed about the core element; and

a fluid permeable ion exchange resin layer disposed about the core element and pleated filter media and adapted to remove mineral and organic acids from fluid passing through the filter element.

22. The filter assembly of claim 21, further comprising first and second fluid permeable separation layers sandwiching the ion exchange resin layer therebetween.

23. The filter assembly of claim 22, wherein the first separation layer is disposed immediately about the pleated filter media and the second separation layer is disposed immediately about the ion exchange resin layer.

24. The filter assembly of claim 22, wherein the first and second separation layers are made of a material selected from the group consisting of glass, cellulose, spun-bonded nylon, and polyester.

25. The filter assembly of claim 21, further comprising a fluid permeable outer casing disposed about the core element, pleated filter media, and ion exchange resin layer.